What is claimed is:

1. A method of determining a volume of liquid within a tank during motion, comprising:

receiving tank geometry information;

receiving sensor configuration information;

receiving tank motion information;

computing a fuel-plane-to-sensor intersection for at least one tank position based on the tank motion information;

computing a wetted volume at every fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information; and

computing a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the wetted volumes.

2. The method of Claim 1, further comprising computing an error for each computation of fuel quantity, and comparing the error with at least one previously computed error.

3. The method of Claim 2, further comprising adjusting a gain of at least one of the sensors based on the comparison between the error and the previously computed error, and repeating the computing of the wetted volumes, the computing of the fuel quantities, the computing of the error, and the comparing of the error.

4. The method of Claim 1 wherein receiving tank geometry information includes receiving height-to-volume values.

5. The method of Claim 1 wherein receiving tank geometry information includes receiving an input file of height-to-volume values from a storage device.

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6. The method of Claim 1, wherein computing a fuel-plane-to-sensor intersection includes interpolating the height-to-volume information from the tank geometry information to a desired attitude.

7. The method of Claim 1, wherein computing a fuel-plane-to-sensor intersection includes mathematically transforming sensor coordinates from the sensor configuration information.

8. The method of Claim 1, further comprising determining a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

9. The method of Claim 8, further comprising optimizing the error for a single motion condition if the fuel gauging system is non-linear.

10. The method of Claim 9, wherein the single motion condition includes a single attitude.

11. The method of Claim 8, further comprising optimizing the error for a plurality of motion conditions if the fuel gauging system is non-linear.

12. The method of Claim 11, wherein the plurality of motion conditions includes a plurality of attitudes.

13. A computer program product for determining a volume of liquid within a tank during motion, comprising:

a first computer program portion adapted to receive tank geometry information;

a second computer program portion adapted receive sensor configuration information;

a third computer program portion adapted to receive tank motion information;

a fourth computer program portion adapted to compute a fuel-plane-to-sensor intersection for at least one tank position based on the tank motion information;

a fifth computer program portion adapted to compute a wetted volume at every fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information; and

a sixth computer program portion adapted to compute a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the wetted volumes.

14. The computer program product of Claim 13, further comprising a seventh computer program portion adapted to compute an error for each computation of fuel quantity, and to compare the error with at least one previously computed error.

15. The computer program product of Claim 14, further comprising a seventh computer program portion adapted to adjust a gain of at least one of the sensors based on the comparison between the error and the previously computed error.

16. The computer program product of Claim 13, wherein the first computer program portion is adapted to receive height-to-volume values.

17. The computer program product of Claim 13, wherein the fourth computer program portion is adapted to interpolate height-to-volume information from the tank geometry information to a desired attitude.

18. The computer program product of Claim 13, further comprising a seventh computer program portion adapted to determine a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

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19. The computer program product of Claim 18, further comprising an eighth computer program portion adapted to optimize the error for at least one motion condition if the fuel gauging system is non-linear.

20. The computer program product of Claim 19, wherein the at least one motion condition includes an attitude.

21. A system for determining a volume of liquid within a tank during motion, comprising:

a control component;

an input/output device coupled to receive vibrational data; and

a processor arranged to analyze the vibrational data, the processor including:

a first portion adapted to receive tank geometry information;

a program portion adapted receive sensor configuration information;

a third portion adapted to receive tank motion information;

a fourth portion adapted to compute a fuel-plane-to-sensor intersection for at least one tank position based on the tank motion information;

a fifth portion adapted to compute a wetted volume at every fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information; and

a sixth portion adapted to compute a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the wetted volumes.

22. The system of Claim 21, wherein the processor further includes a seventh portion adapted to compute an error for each computation of fuel quantity, and to compare the error with at least one previously computed error.

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23. The system of Claim 22, wherein the processor further includes a seventh portion adapted to adjust a gain of at least one of the sensors based on the comparison between the error and the previously computed error.

24. The system of Claim 21, wherein the first portion is adapted to receive height-to-volume values.

25. The system of Claim 21, wherein the fourth portion is adapted to interpolate height-to-volume information from the tank geometry information to a desired attitude.

26. The system of Claim 21, wherein the processor further includes a seventh portion adapted to determine a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

27. The system of Claim 26, wherein the processor further includes an eighth portion adapted to optimize the error for at least one motion condition if the fuel gauging system is non-linear.

28. The system of Claim 27, wherein the at least one motion condition includes an attitude.

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